

# AUSTRALIAN PATENT OFFICE

## SEARCH REPORT

Applicant's or agent's file reference 519898SG		
Application No. SG 200005729-9	Application Filing Date ( <i>day/month/year</i> ) 5 October 2000	(Earliest) Priority Date ( <i>day/month/year</i> ) 5 October 1999
Applicant NEC CORPORATION		

This search report consists of a total of **5** sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. ☐ Certain claims were found unsearchable (See Box I)

2. ☒ Unity of invention is lacking (See Box II)

3. ☐ The application contains disclosure of a **nucleotide and/or amino acid sequence listing** and the search was carried out on the basis of the sequence listing

☐ filed with the application

☐ furnished by the applicant separately from the application,

☐ but not accompanied by a statement to the effect that it did not include matter going beyond the disclosure in application as filed

4. With regard to the **title**

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Office to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant

☐ the text has been established by this Office as it appears in Box III

6. The figure of the **drawings** to be published with the abstract is:

Figure No. **7M**

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure

☐ because this figure better characterises the invention

☐ None of the figures

**Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)**

This search report has not been established in respect of certain claims for the following reasons:

1. ☐ Claims Nos.

because they relate to non-patentable subject matter (sections 13 and 16) not required to be searched by this Office, namely:

2. ☐ Claims Nos.

because they relate to parts of the application that does not comply with the prescribed requirements (sections 25(4) and 25(5)) to such an extent that no meaningful search can be carried out, specifically:

**Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)**

This Office found multiple inventions in this application, as follows:

1. Claims 1-42, 57-79 directed to various aspects of a device and method in which a high rigidity plate is securely fixed to an interconnection board for suppressing bending of the board (independent claims 1, 8, 60); and a buffer layer in contact with an interconnection board and capable of absorbing and/or relaxing stress applied to a buffer layer electrode to make the interconnection board free from application of stress (independent claim 18). It is considered that a high rigidity plate or buffer layer to suppress bending or stressing of an interconnection board, respectively, comprises a first special technical feature.

2. Claims 43-56 directed to a second special technical feature of a supporting layer on a surface of an interconnection board for supporting external electrodes on the board. These claims appear to be based on the eighth embodiment on pages 171-174 and fig 17 in which the supporting layer is to increase bonding stability between solder balls and external electrode pads, and in which a stress-freeing buffer or bend-suppressing high rigidity plate is not an essential feature (page 172 line 17).

Since the abovementioned groups of claims do not share either of the technical features identified, a "technical relationship" between the inventions, as defined in PCT rule 13.2 does not exist. Accordingly the international application does not relate to one invention or to a single inventive concept.

Accordingly, this Office is reporting only of the main invention of  
claims 1-42, 57-79 , or

Since little extra effort was involved, this Office is reporting on the inventions of  
claims

# AUSTRALIAN PATENT OFFICE

## SEARCH REPORT

Application No.

SG 200005729-9

### C (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	✓ EP 788158 A (INTERNATIONAL BUSINESS MACHINES CORPORATION) 6 August 1997 col 6 lines 23-56	1-4, 6, 7
X	✓ Derwent Abstract Accession No. 97-058122/06, Class U11 U14, JP 08-306745 A (NITTO DENKO CORP) 22 November 1996 abstract	1, 2, 8, 9, 15, 16
X	✓ Derwent Abstract Accession No. 96-214725/22, Class U11, JP 08-078570 A (HITACHI CABLE LTD) 22 March 1996 abstract	1, 2, 8, 9
P, A	✓ US 6002168 A (BELLAAR et al) 14 December 1999 Whole document	18
A	✓ EP 65425 B (MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.) 16 August 1989	

Patent Document Cited in Search Report				Patent Family Member			
US	5136123	JP	63273088				
US	4847136	EP	364551	ES	2010412	IL	88807
		WO	8909534	US	4847146	DK	5820/89
GB	2286084	CN	1110431	CN	1215920	HK	1011499
		JP	7226457	JP	9330996	US	5561323
		US	5519936	US	5633533	US	5773884
EP	788158	JP	9213837	US	5760465	US	5877043
US	6002168	US	6208025	US	2001048591		
EP	65425	JP	57193094	US	4495546		
END OF ANNEX							

## WRITTEN OPINION

Applicant's or agent's file reference <b>519898SG</b>		Date of mailing <i>day/month/year</i> <b>16 MAY 2002</b>
Application No. <b>SG 200005729-9</b>		Application Filing Date ( <i>day/month/year</i> ) <b>5 October 2000</b>
International Patent Classification (IPC) (as indicated in the search report)		Priority Date ( <i>day/month/year</i> ) <b>5 October 1999</b>
Int. Cl. <sup>7</sup> <b>H01L 23/50, 21/58, 21/60, 21/68</b>		
Applicant <b>NEC CORPORATION</b>		

1.	This First written opinion consists of a total of 6 sheets.
2.	This opinion contains indications relating to the following items: <ul style="list-style-type: none"> <li>I <input checked="" type="checkbox"/> Basis of the opinion</li> <li>II <input checked="" type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</li> <li>III <input checked="" type="checkbox"/> Lack of unity of invention</li> <li>IV <input checked="" type="checkbox"/> Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</li> <li>V <input type="checkbox"/> Certain documents cited</li> <li>VI <input type="checkbox"/> Certain defects in the application</li> <li>VII <input checked="" type="checkbox"/> Certain observations on the application</li> </ul>
3.	This opinion is based upon the assumption that the priority claim is valid.
4.	The search report used was issued by the <b>Australian Patent Office</b> , and the date of completion is: <b>10 May 2002</b>
5.	If no reply is filed, the examination report will be established on the basis of this opinion.
6.	The date by which the examination report will be established is: <b>5 January 2004</b>

Name and mailing address AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustalia.gov.au Facsimile no. 61 2 62853929	Authorized Officer  <div style="text-align: center; font-weight: bold;">M.E. DIXON</div>
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I. Basis of the opinion

1. This opinion has been drawn on the basis of:

☐ the application as originally filed.

☒ the description, pages , as originally filed,  
pages , filed with the request,  
pages 1-240 , received on 22 January 2001 with the letter of 22 January 2001

☒ the claims, pages , as originally filed,  
pages , filed with the request,  
pages 241-259 , received on 22 January 2001 with the letter of 22 January 2001

☒ the drawings, sheets/fig. , as originally filed,  
sheets/fig. , filed with the request,  
sheets/fig. 1-158 , received on 22 January 2001 with the letters of 22 January 2001

2. The amendments have resulted in the cancellation of: pages:  
sheets of drawings/figures No :

3. ☐ This opinion has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box.

4. Additional observations, if necessary:

II. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been and will not be examined in respect of:

☐ the entire application,

☒ claims Nos: 43-56

because:

☐ the said application, or the said claim Nos. relate to the following non-patentable subject matter (section 13(3)) which does not require an examination (*specify*):

☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos are so unclear that no meaningful opinion could be formed (*specify*):

☐ the claims, or said claims Nos are so inadequately supported by the description that no meaningful opinion could be formed.

☒ no search report has been established for said claim Nos. 43-56

III. Lack of unity of invention

1. This Office found multiple invention in this application, as follows:

1. Claims 1-42, 57-79 directed to various aspects of a device and method in which a high rigidity plate is securely fixed to an interconnection board for suppressing bending of the board (independent claims 1, 8, 60); and a buffer layer in contact with an interconnection board and capable of absorbing and/or relaxing stress applied to a buffer layer electrode to make the interconnection board free from application of stress (independent claim 18). It is considered that a high rigidity plate or buffer layer to suppress bending or stressing of an interconnection board, respectively, comprises a first special technical feature.

2. Claims 43-56 directed to a second special technical feature of a supporting layer on a surface of an interconnection board for supporting external electrodes on the board. These claims appear to be based on the eighth embodiment on pages 171-174 and fig 17 in which the supporting layer is to increase bonding stability between solder balls and external electrode pads, and in which a stress-freeing buffer or bend-suppressing high rigidity plate is not an essential feature (page 172 line 17).

Since the abovementioned groups of claims do not share either of the technical features identified, a "technical relationship" between the inventions, as defined in PCT rule 13.2 does not exist. Accordingly the international application does not relate to one invention or to a single inventive concept.

2. Consequently, the following parts of the application were the subject of examination in establishing this report:

☐ all parts.

☒ the parts relating to claims Nos. 1-42, 57-59



IV. Reasoned statement under with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims 5, 12, 17-42, 57-59, 62, 65-79	YES
	Claims 1-4, 6-11, 13-16, 60, 61, 63, 64	NO
Inventive step (IS)	Claims 5, 12, 17-42, 57-59, 62, 65-79	YES
	Claims 1-4, 6-11, 13-16, 60, 61, 63, 64	NO
Industrial applicability (IA)	Claims 1-42, 57-59	YES
	Claims	NO

2. Citations and explanations

**US 5136123** - in fig 1 high rigidity plates 6A, 6B are securely fixed to the interconnection board 9. A base 3A is formed of a polymer resin material. In fig 2 the high rigidity plates are 14A, 14B. The interconnection board remains securely fixed to the high rigidity plate(s) during its formation.  
All the features of claims 1, 6, 7, 60 are disclosed.

**US 4847136** - fig 2 shows high rigidity metal plate 22 securely fixed to interconnection board 26, 28, 30 during formation of the board.  
All the features of claims 1-4, 6-11, 13, 14, 60, 61, 63, 64 are disclosed.

**GB 2286084** - discloses multilayer interconnection board 11 securely fixed to high rigidity plate 31.  
All the features of claims 1-4, 6, 7 are disclosed.

**EP 788158** - discloses high rigidity plate 13 securely fixed to interconnection board 15 (see fig 1).  
All the features of claims 1-4, 6, 7 are disclosed.

✓ **JP 08-306745** - describes high rigidity plate 20 stuck on one surface of multilayer interconnection board 24, 25 with a semiconductor chip 1 on the other surface.  
All the features of claims 1, 2, 8, 9, 15, 16 are disclosed.

✓ **JP 08-078570** - shows chip 5 on multilayer interconnection board 6 securely fixed to high rigidity plate 11.  
All the features of claims 1, 2, 8, 9 are disclosed.

VII. Certain observations on the application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Claims 58, 59 are not clear and succinct due to their repetitious nature. They are identical to claims 25, 26 respectively.

☒ The claimed invention is patentable according to Section 13(3); or

☐ The claimed invention is unpatentable according to Section 13(3) because:

**AUSTRALIAN PATENT OFFICE**  
**SEARCH REPORT**

Application No.  
SG 200005729-9

**A. CLASSIFICATION OF SUBJECT MATTER**

According to International Patent Classification (IPC)  
Int. Cl. <sup>7</sup> H01L 23/50, 21/58, 21/60, 21/68

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the search (name of data base and, where practicable, search terms used)  
DWPI, JAPIO: IPC H01L 21/58, 21/60, 21/68, 23/12, 23/13, 23/14, 23/15, 23/48, 23/492, 23/498, 23/50, 23/52, 23/538, H05K 3/46 and Keywords: *semiconductor, chip, IC, integrated circuit, COB, flip chip, face bonded, (interconnection, wiring)(w)(board, plate), chip carrier, rigid, inflex, stiff, reinforc, stress, bend, bent, thermal expansion coefficient, multi(w)(layer, level)*

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	✓ US 5136123 A (KOBAYASHI et al) 4 August 1992 Whole document	1, 6, 7, 60
X	US 4847136 A (LO) 11 July 1989 Col 2 line 47 - col 3 line 57	1-4, 6-11, 13, 14, 60, 61, 63, 64
X	✓ GB 2286084 A (INTERNATIONAL BUSINESS MACHINES CORPORATION) 2 August 1995 page 3 line 29 - page 4 line 12, page 5 line 36 - page 6 line 17; figs	1-4, 67

☒ Further documents are listed in the continuation of Box C

☒ See patent family annex

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier application or patent but published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of submission of the request to the Australian Patent Office  
11 March 2002

Date of completion of the search report  
10 May 2002

Date of mailing of the search report  
16 MAY 2002

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Authorised officer  
**M.E. DIXON**

Hirokazu HONDA-U.S. Appl. No. 09/678,609  
Your Ref.: PF-2683/NEC/US/mh

Claims 1-42  
Citations 1-3

Remarks: a wiring substrate which accumulates multiple insulation layers and wiring layers is already known, from such as that which is recorded in Citations 1 and 2. With a semiconductor device which is columnar in shape as well, the adoption of known technology could be appropriately obtained by one skilled in the Art. In addition, the shape of a semiconductor is nothing more than a simple matter of design.

Reference Citation List

1. Japanese Laid Open Patent Publication Hei 6-177278
2. Japanese Laid Open Patent Publication Hei 11-238972
3. Pamphlet of International Laid Open Patent Publication 96/09645

## 拒絶理由通知書

特許出願の番号	特願2000-057767
起案日	平成14年 4月 2日
特許庁審査官	坂本 薫昭 9265 4R00
特許出願人代理人	工藤 実(外 1名) 様
適用条文	第29条第2項、第37条

この出願は、次の理由によって拒絶をすべきものである。これについて意見があれば、この通知書の発送の日から60日以内に意見書を提出して下さい。

## 理 由

1. この出願の下記の請求項に係る発明は、その出願前日本国内又は外国において頒布された下記の刊行物に記載された発明又は電気通信回線を通じて公衆に利用可能となった発明に基いて、その出願前にその発明の属する技術の分野における通常の知識を有する者が容易に発明をすることができたものであるから、特許法第29条第2項の規定により特許を受けることができない。

## 記

(引用文献等については引用文献等一覧参照)

- ・請求項 1-24
- ・引用文献等 1-2
- ・備考

パッド毎に独立して設けられた柱状の導電体は引用例2に記載されるように周知であり、引用例1に記載されるような多層配線を有する配線基板においても上記周知技術を採用することは当業者が適宜なし得たものにすぎない。

2. この出願は、下記の点で特許法第37条に規定する要件を満たしていない。

## 記

(1) 請求項1に係る物の発明と、請求項25-29に係る物の発明とは解決しようとする課題が同一であるとも、構成に欠くことができない事項の主要部が同一であるとも認められない。

(2) 請求項25-29に係る物の発明は、請求項13に係る方法の発明の実施に直接使用する機械、器具、装置その他の物とは認められない。

また、請求項13に係る方法の発明は、請求項25-29に係る物の発明に対して、その物を生産する方法、使用する方法、取り扱う方法であるとは認められない。

発送番号 106719

発送日 平成14年 4月 4日 2 / 2

この出願は特許法第37条の規定に違反しているので、請求項1-24以外の請求項に係る発明については同法第37条以外の要件についての審査を行っていない。

引用文献等一覧

1. 特開平10-275878号公報
2. 特開平11-233556号公報

先行技術文献調査結果の記録

- ・調査した技術分野 IPC第7版  
H01L 23/12

この先行技術文献調査の記録は、拒絶理由を構成するものではない。

この拒絶理由通知書の内容に関する問い合わせ先  
特許審査第三部 電子素材加工 審査官 坂本薫昭

HONDA-U.S. Pat. Appl. 09/678,609  
Ref. PF-2683/NEC/US/mh

Claims 1-24  
Citations 1-2

Remarks:

As is noted in Citation 2, the independent attachment of column shaped semiconductor for each pad is known technology, and even in a wiring substrate which has multiple layer wiring, such as that recorded in Citation 1, the adoption of known technology is nothing more than that which could be obtained by one skilled in the art.

Reference Citation List

1. Japanese Laid Open Patent Publication Hei 10-275878
2. Japanese Laid Open Patent Publication Hei 11-233556

整理番号 75310411

発送番号 210848

発送日 平成14年 6月28日 1 / 2

## 拒絶理由通知書

特許出願の番号	特願2000-057767
起案日	平成14年 6月26日
特許庁審査官	坂本 薫昭 9265 4R00
特許出願人代理人	工藤 実(外 1名) 様
適用条文	第29条第2項

この出願は、次の理由によって拒絶をすべきものである。これについて意見があれば、この通知書の発送の日から60日以内に意見書を提出して下さい。

### 理 由

この出願の下記の請求項に係る発明は、その出願前日本国内又は外国において頒布された下記 of 刊行物に記載された発明又は電気通信回線を通じて公衆に利用可能となった発明に基いて、その出願前にその発明の属する技術の分野における通常の知識を有する者が容易に発明をすることができたものであるから、特許法第29条第2項の規定により特許を受けることができない。

### 記 (引用文献等については引用文献等一覧参照)

- ・請求項 1～42
- ・引用文献等 1～3
- ・備考

複数の絶縁層と配線層を積層する配線基板は引用例1、2に記載されるように周知であり、引用例3に記載されるような柱状の導電体を有する半導体装置においても、上記周知技術を採用することは当業者が適宜なし得たものと認められる。また、導電体の形状は単なる設計事項にすぎない。

### 引 用 文 献 等 一 覧

1. 特開平6-177278号公報
2. 特開平11-238972号公報
3. 国際公開第96/09645号パンフレット

### 先行技術文献調査結果の記録

- ・調査した技術分野 IPC第7版  
H01L 23/12



発送番号 210848

発送日 平成14年 6月28日 2 / 2

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この先行技術文献調査の記録は、拒絶理由を構成するものではない。

この拒絶理由通知書の内容に関する問い合わせ先

特許審査第三部 電子素材加工 審査官 坂本薫昭

電話 03-3581-1101 内線 6362